REMARKS

An Office Action was mailed August 8, 2007. This response is timely. Any fee due with this paper, including any necessary extension fees, may be charged on Deposit Account 50-1290. A refund may be made to Deposit Account 50-1290.

Summary

Claims 1-18 are pending, of which claim 1 is the sole independent claim.

By the foregoing, claim 1 and certain claims depending from claim 1 are amended to bring same to compliance for practice before the U.S. Patent & Trademark Office in non-limiting manner. No new matter has been added.

Rejections under 35 U.S.C. §102(b)

Independent claim 1 and dependent claims 2, 4, and 6-10 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,391,132 to Egami et al.

The presently claimed invention is a module for heating intake gases in internal combustion engine. As taught in the specification, prior art heaters did not incorporate two important aspects: (1) the ability to determine the temperature of the airflow to optimize engine performance and (2) means for utilizing a more cost-effective plastic manifold in the air flow by controlling temperatures.

The presently claimed invention solves these problems. For example, in a 2000 cc diesel engine operating at 1000 RPMs, a heater capable of dissipating 1 kW in a plastic intake pipe will increase the temperature of the airflow by approximately 50°C. However, the heating resistors themselves will have a temperature of 1000°C.

If the airflow has stopped due to engine management and the temperature is unknown, significant consequences may occur. Thus, the engine needs to be protected from overheating.

The presently claimed invention does so by measuring a single reference temperature disposed at the positions taught at least with respect to Figs. 5-8. Therein, the temperature may be determined at a support (Figs. 5 and 8), at one of the heating resistors (Fig. 6), or in the proximity of the resistor (Fig. 7). Once determined, the reference temperature may be used to cease energy input when a predetermined temperature value is exceeded. This temperature may be set for any degree of safety and usability for a specific engine. .

Egami alone or in combination with other cited art does not teach, disclose, or suggest the claimed invention. The Examiner finds that Egami teaches a temperature control unit 15 connected to a field control unit 16 that is used for heating gas circulating through an intake pipe 3. A heating element 10 provided in a housing 9 is connected by a support to the temperature control unit. These are asserted to be the heating element and the power control unit that are formed in the same module. Applicant respectfully disagrees.

Egami teaches an apparatus for measuring gas flow and more specifically an apparatus for measuring the flow rate of engine intake air as taught at col. 1, lines 5-15, wherein *"The present invention relates to a gas flow measuring apparatus, or more in particular an apparatus for measuring the flow rate of the engine intake air."* Emphasis added.

As Egami explains "*Conventional apparatuses [flowmeters} have been known, which include a flow rate measuring tube in the intake pipe, an electric heater in the flow rate measuring tube, and a pair of temperature-dependent resistors disposed before and after the electric heater, thereby to measure the flow rate of the intake air in response to the outputs of the resistors".*

In fact, Egami teaches that his preferred embodiment, col. 2, lines 39 et al., comprises *"measuring tube (9) contains therein an electric heater (10) of platinum resistance wire [...], a first temperature dependent resistor (11) of platinum resistance wire in proximity to and downstream of the electric heater (10), and a second temperature dependent resistor (12) of platinum resistance wire disposed a little distant from and upstream of the electric heater (10)".*

Therein, at col. 2, lines 61-66, Egami teaches that *"the electric heater (10), the first and second temperature dependent resistors (11) and (12) are connected to a measuring circuit (15), which measures the flow rate of the intake air in response to the output signals of the first and second temperature dependent resistors and produces an electric signal associated with the flow rate."* Emphasis added.

Regarding the function of said flowmeter in engine control, Egami continues at col. 2, lines 67-69 indicate *"A fuel control unit (16) is mainly for controlling the open time of the electromagnetic fuel injection valve (5) in response to the signal from the measuring circuit (15)."* Emphasis added.

It is well understood by those skilled in the art that it is impossible to implement a flowmeter with a single measurement of flow rate temperature. The principle of a hot wire flowmeter is based on knowing the temperature variation of the flow rate as a response to energy supply and knowing the variation implies measuring upstream and downstream from the point where the energy is supplied.

Indeed, Egami claims a certain way of building a classic hot wire flowmeter: temperature sensor (11) and an electric heater (10) and temperature sensor (12). Specifically, Egami claims: taking temperature readings, sending these to a differential amplifier, comparing this temperature difference with a reference value and modifying the heat supplied to the electric heater such that the temperature difference measured by the two sensors is constant and equal to the reference value. Having done this, the measured voltage supplied to the generated by the electric heater is the measurement of flow rate.

In other words, Egami measures a differential between temperature-dependent resistors 11 and 12, so that an isolated resistance, for example 11, can determine the temperature of the flow. To do so, requires knowing the temperature of the flow before and after providing a certain amount of heat, i.e., it is necessary to know at least two temperatures - at resistors 11 and 12 -, and the value of heat supplied.

The difference between the flowmeter patented by Egami and classical hot wire flowmeters is the manner in which energy is supplied to the electrical heater, whereas in classical flowmeters the energy is supplied linearly, Egami claims the supply to be switched.

In the presently claimed invention, a single reference temperature measurement is used. The measurement is auxiliary it serves to protect the part and its environment from overheating. In contrast, in a flowmeter, temperature measurements are the main functions, and the flow rate cannot be known without these two measurements and the energy dissipated in the heater (10).

In fact, in the flowmeter's heater the energy dissipated in the heater is proportional to the flow rate - the greater the flow rate the greater the energy dissipated and vice versa. Thus, by design there is no risk of overheating associated to dissipating heat when there is no flow rate.

The flowmeter's heater performs functions that are not performed by the claimed invention. The function of the flowmeter's heater is aiding a cold start. In other words, the function is providing heat before the engine starts rotating, and therefore before there is any airflow through the intake pipe.

In contrast, in the claimed invention, there is a serious risk of destruction by overheating of the system and its environment. This risk is minimized by implementing a temperature control as described. The claimed module comprises at least one resistance heating in a single measure temperature. In fact, Egami teaches away as discussed above, in that a resistance heater and two or more temperature measurements are utilzied.

To one skilled in the art, it is clear that the claimed module can heat the airflow and implement temperature control, while Egami teaches a flowmeter. The claimed module incorporates resistance not dependent on the temperature and isolated from each other respect, and the extent of global temperature because it will be provided in the frame utilized to protect the intake manifold plastic before overheating when the airflow is unknown.

All dependent claims are allowable for at least the same reasons as the independent claim from which they depend.

In view of the remarks set forth above, this application is in condition for allowance which action is respectfully requested. However, if for any reason the Examiner should consider this application not to be in condition for allowance, the Examiner is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

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Respectfully submitted,

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